

WHAT IS CLAIMED IS:

1. The substrate specific *DFR* nucleic acids and encoding DFRs that have altered amino acid sequences at the substrate specificity determining region due to the altered nucleic acid sequences encoding amino acids at the substrate specificity determining region.
2. The substrate specific *DFR* nucleic acids and encoding DFR of claim 1 which catalyzes DHK preferentially over DHQ and DHM.
3. The substrate specific *DFR* nucleic acids and encoding DFR of claim 2 which has altered amino acid at 134th residue of *Gerbera* DFR or the corresponding amino acid residues of DFRs from other species.
4. The substrate specific *DFR* nucleic acids and encoding DFR of claim 3 which has leucine instead of asparagine at the said residue.
5. An angiosperm plant comprising at least one cell transformed with a vector comprising at least a portion of the substrate specific *DFR* nucleic acids of claim 1 and wherein said plant has the increased content of one class of pigment preferentially.
6. An angiosperm plant comprising at least one cell transformed with a vector comprising at least a portion of the substrate specific *DFR* nucleic acids of claim 2 and wherein said plant has the increased content of pelargonidin-based pigments.
7. An angiosperm plant comprising at least one cell transformed with a vector comprising at least a portion of the substrate specific *DFR* nucleic acids of claim 3 and wherein said plant has the increased content of pelargonidin-based pigments.

8. An angiosperm plant comprising at least one cell transformed with a vector comprising at least a portion of the substrate specific *DFR* nucleic acids of claim 4 and wherein said plant has the increased content of pelargonidin-based pigments.

9. The plant of claim 5, 6, 7, and 8 wherein said vector comprises a promoter

5 operably linked to said *DFR* nucleic acids.

10. The plant of claim 9 wherein said promoter comprises a constitutive promoter.

11. The plant of claim 10 wherein said promoter comprises a cauliflower mosaic virus promoter.

10 12. The plant of claim 9 wherein said promoter comprises a tissue specific promoter.

13. The plant of claim 9 wherein said promoter comprises an inducible promoter.

14. A vector capable of transforming a plant cell to increase the content of one class of pigments preferentially in a plant containing said cell, said vector comprising at least a portion of the substrate specific *DFR* nucleic acids operably linked to a
15 promoter.

15. The vector of claim 14 wherein said substrate specific *DFR* nucleic acids are DHK-specific *DFR* nucleic acids.

16. The vector of claim 14 wherein said one class of pigments is pelargonidin-based pigments.

20 17. The vector of claim 14 wherein said promoter is cauliflower mosaic virus promoter.

18. A method for producing a plant having a phenotype characterized by the increased content of one class of pigments, said method comprising at least a step of:
transforming plant cells with a vector comprising at least a portion of substrate
25 specific *DFR* nucleic acids operably linked to a promoter;

regenerating plants from one or more of the transformed plant cells; and

selecting at least one plant having said phenotype.

19. The method of claim 18 wherein said one class of pigments is pelargonidin-based pigments.

5 20. The method of claim 18 wherein said promoter comprises a cauliflower mosaic virus promoter.

21. An angiosperm plant produced according to the method of claim 18.

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